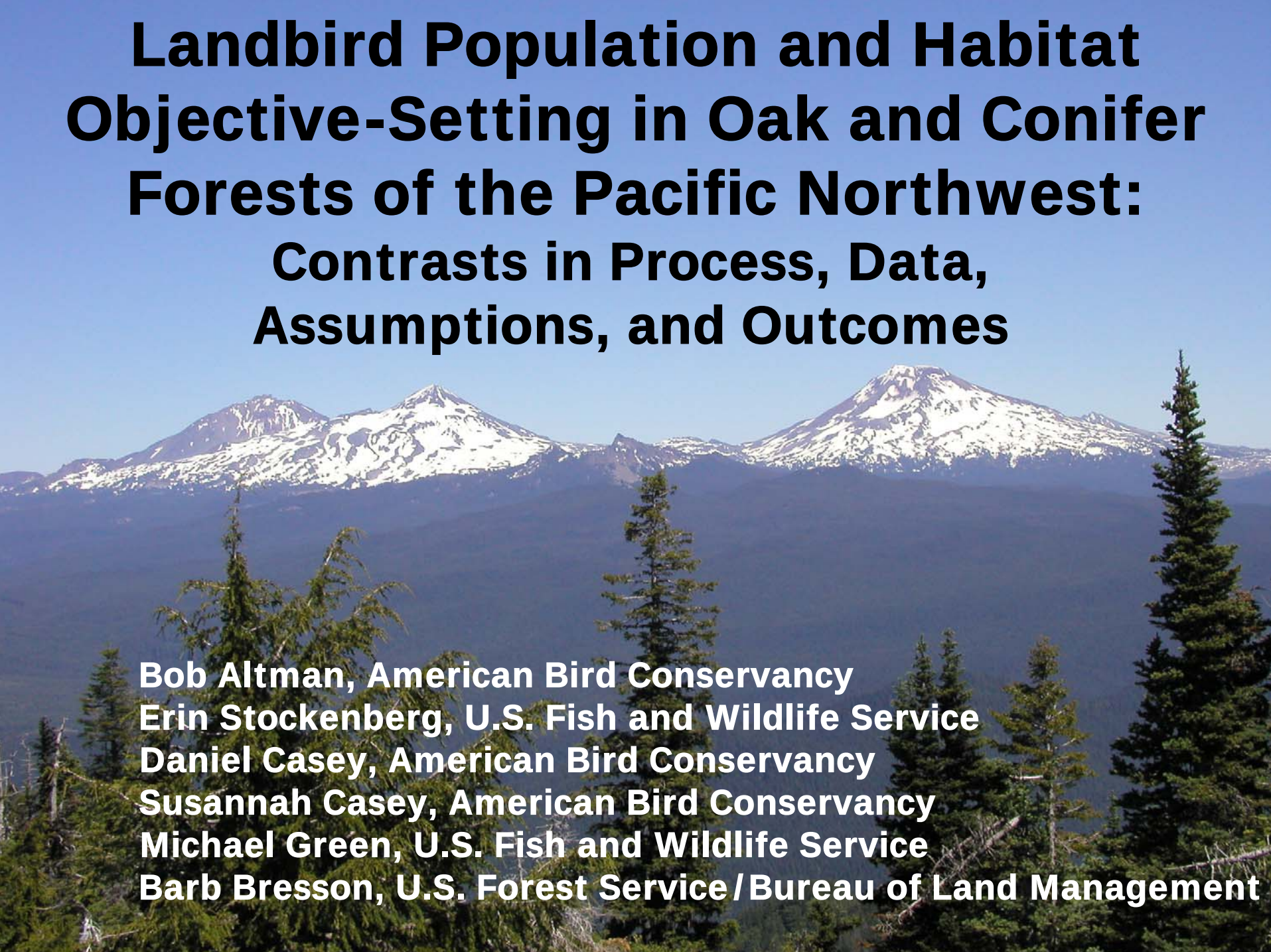
Landbird Population and Habitat Objective-Setting in Oak and Conifer Forests of the Pacific Northwest:

Contrasts in Process, Data, Assumptions, and Outcomes



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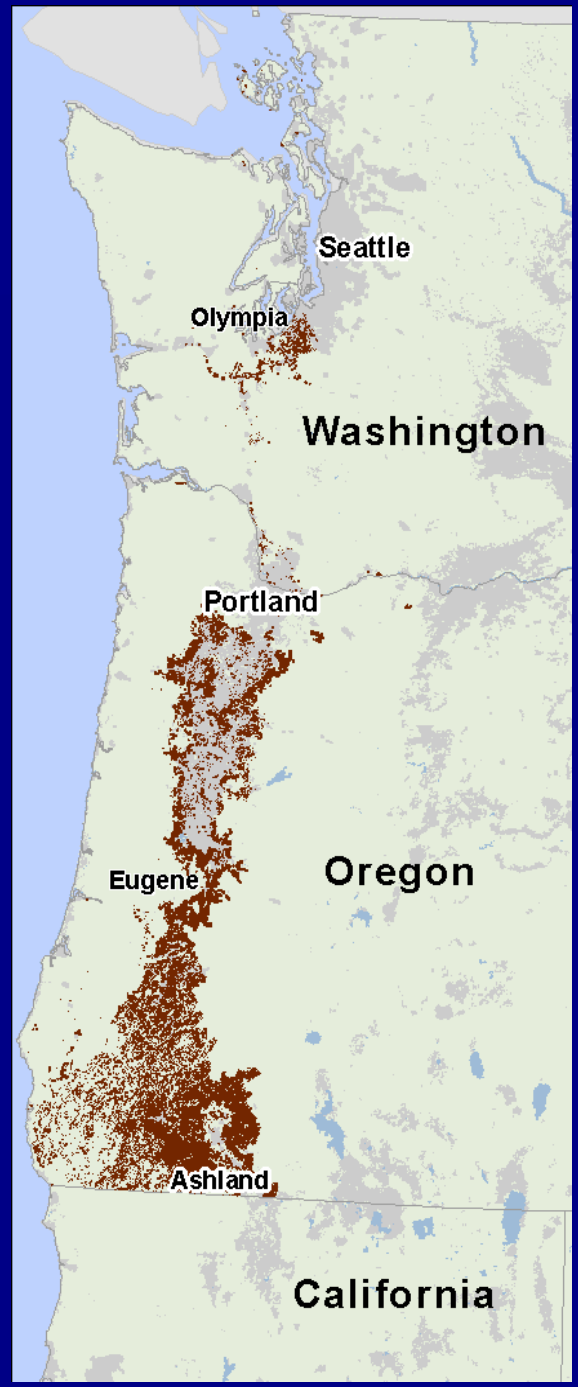
- U.S. Fish and Wildlife Service, Migratory Birds Program, Portland
- Pacific Coast Joint Venture
- Neotropical Migratory Bird Conservation Act

Geographic and Habitat Perspective



Green: Conifer Forest

Brown: Oak Habitats

Project Study Areas

Hamma Hamma = Conifer Forest (pilot)

South Puget = Oak Habitats (BCR 5)

Process: 4 of the 5 Elements

- Build Bird-Habitat Models
  - Focal Species and Bird Density Estimates
  - Other parameters (e.g., elevation, patch size and proximity)
- Conduct Geospatial Analyses
  - Analysis of independent layers vs a merged layer
- Calculate Population Estimates
  - Bottom-up density-driven
- Apply Population Objectives
  - Regionalized Continental Process
- Project Future Landscapes
  - Data, land management projections, assumptions
- Conduct Optimization and Establish Habitat and Population Objectives
  - Among species, habitats, places

Contrasts: Oak vs Conifer

Conifer Forest	Oak Habitats
Watershed	Sub-ecoregion
Managed landscape (95% public)	Developed landscape (65% private)
Contiguous distribution	Very patchy distribution
Independent GIS layers	Merged GIS layers
Age class/seral stage	Habitat overstory conditions
Hypothetical forest management future	Projected future – data, consultations with land managers
Good bird data	Poor-Fair bird data
Not spatially explicit	Very spatially explicit

Focal Species

Conservation directed towards a suite of species that sufficiently represent the range of desired habitat conditions in a habitat should also address the habitat needs of most if not all the other species in that habitat type (Lambeck 1997)

- Rationale
- Selection Process
- Assign to GIS classes
- Region Specific
- Pros and Cons

Bird-Habitat Models

Conifer Focal Species

Desired Habitat Condition	Focal Species
Mid-Late Successional Closed Coniferous Canopy	Hermit Warbler
Mid-Late Successional Multi-layered Subcanopy	Varied Thrush
Mid-Late-Successional Hardwood Subcanopy	Pacific-slope Flycatcher
Mid-Late-Successional Complex Understory	Winter Wren
Early-Mid-Late Successional Shrub and Sapling Patches	Swainson's Thrush
Early Successional Dense Shrub Layer	Orange-crowned Warbler

VASW and OSFL??

Oak Focal Species

Desired Habitat Condition	Focal Species
Large Trees with Large Cavities	Downy Woodpecker
Large or Small Trees with Small Cavities	Black-capped Chickadee
Mature Overstory with Open Canopy and Edges	Western Wood-pewee
Mature Overstory with Closed or Open Canopy	Purple Finch
Mature Overstory with Open Understory or Young Overstory with Open Understory	Chipping Sparrow

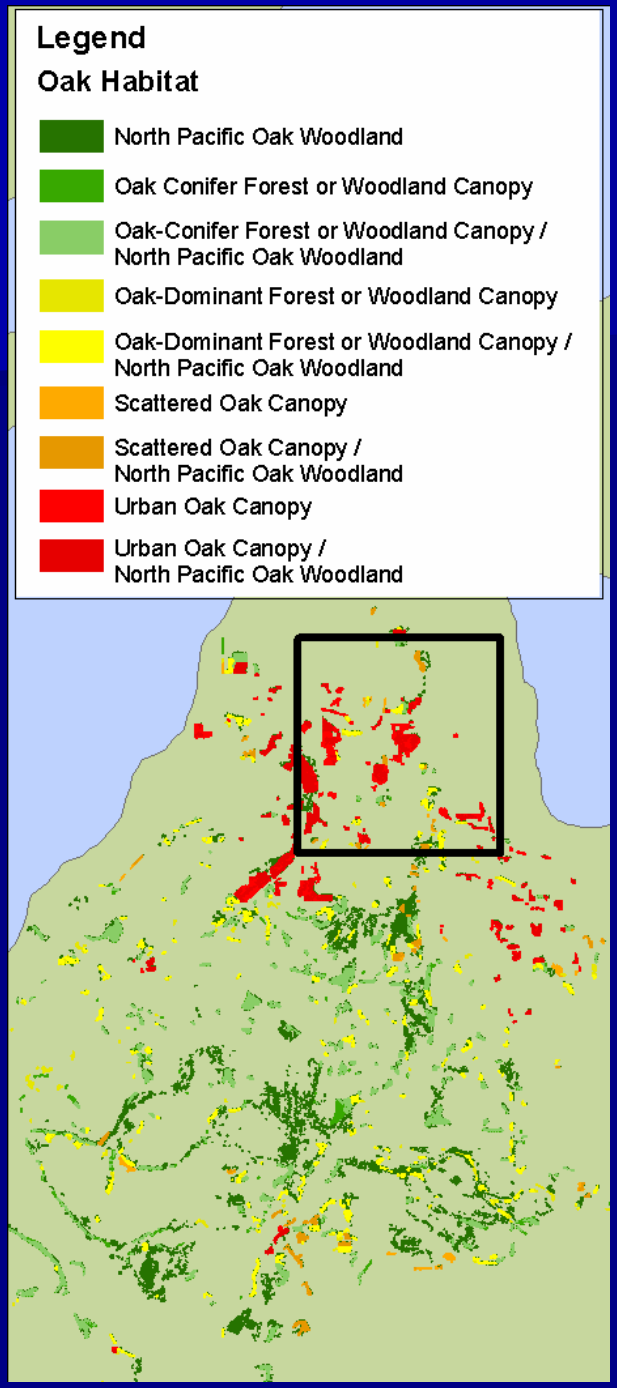
Bird Densities

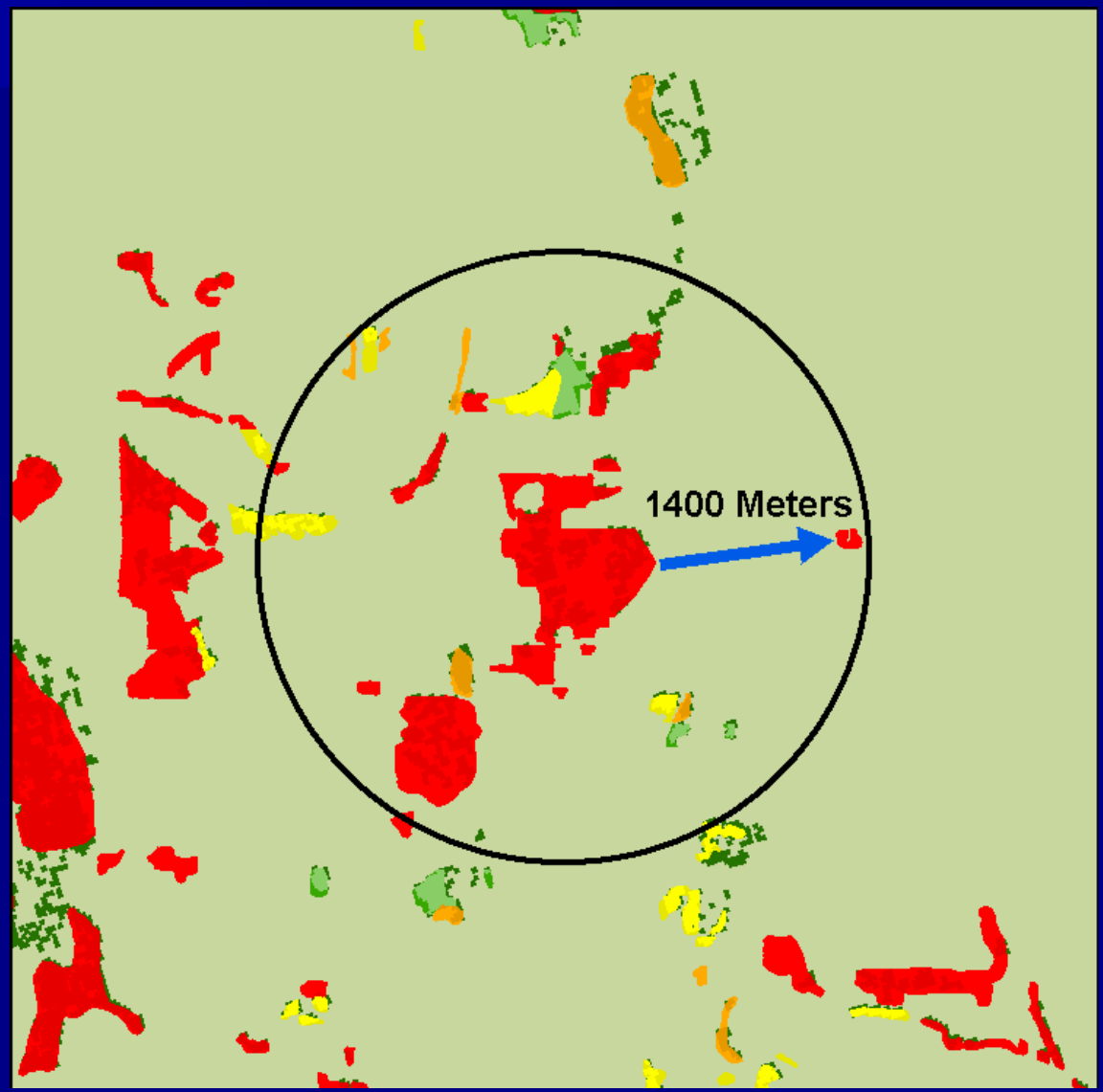
- Importance
- Build database from extensive search
  - Often won't have site-specific data
  - in-house reports, theses, dissertations
  - BBC
  - e.g., PSFL
  - e.g., oak – data sheets
- Include many parameters
  - assists in all aspects of model development (elevation, habitat type, age and condition)

Other Model Parameters

- Elevation (oak=no; conifer = yes)
  - All = WIWR
  - >500 m = VATH
  - <1500 m = OCWA, HEWA
  - <1250 m = SWTH, PSFL
- Patch Size and connectivity
  - Conifer = will do
  - Oak = rule sets
- Habitat Condition/Quality
- Productivity/Vital Rates
- Other Factors?

Oak Patch Analyses





GIS Layers Comparison

Conifer Forest	Oak Habitats
ONF TRI - local 4 forest types 6 age classes	WDNR Oak-Prairie - local 4 oak types
IVMP - regional 3 forest types 1-4 age classes	W. WA Re-Gap - regional 1 oak type
ReGap - regional 6 forest types 0 age classes	
WA Land ownership	WA Land ownership
	CLC Futures

Population Estimates Comparison: Hamma Hamma Watershed (USFS)

	ONF TRI	IVMP	WA REGAP
VATH	5,762	6,319	3,370
PSFL	11,295	11,436	8,285

Population Objectives

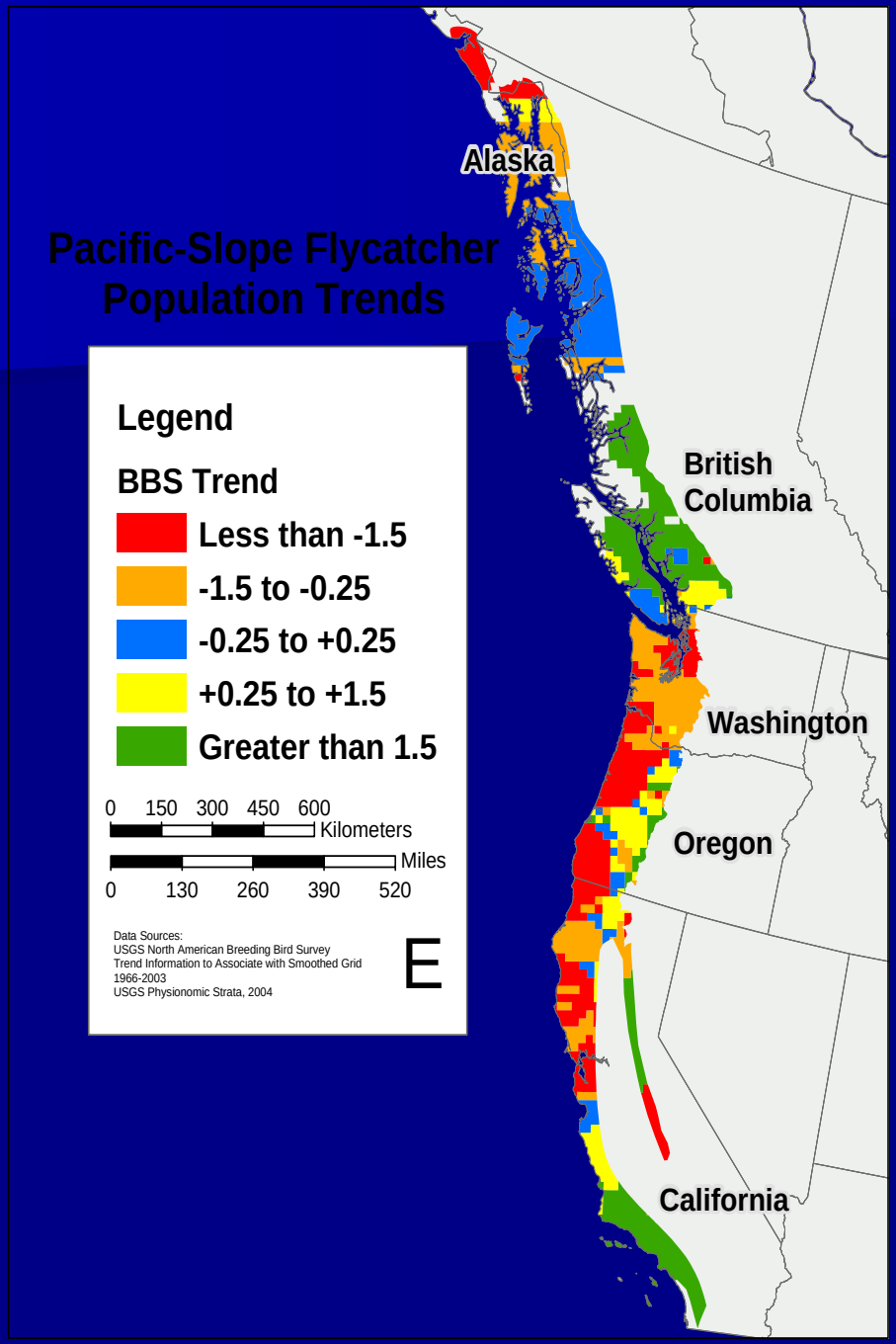
- Continental Population Objectives (ideal)
- Regional/Local Population Objectives (reality)

- Role of “ideal” objective??
  - habitat capacity (and perhaps other factors) ultimately determines “real” objective
- Do we need regional ideal objectives?
- Oak – no? ….habitat losses likely to exceed gains so ”real” objective is what habitat remains

Preliminary (Ideal) Population Objective

- Potential value of Regional “preliminary” population objective
  - Decision-making factor where flexibility and variable capacity exist (e.g., conifer forest successional stages)
- How determined
  - modified national process
  - PSFL example
  - Regional (BCR, Physio trends) and Local – BBS trend maps
- Issues – degree of use of the habitat, areas with low sample size

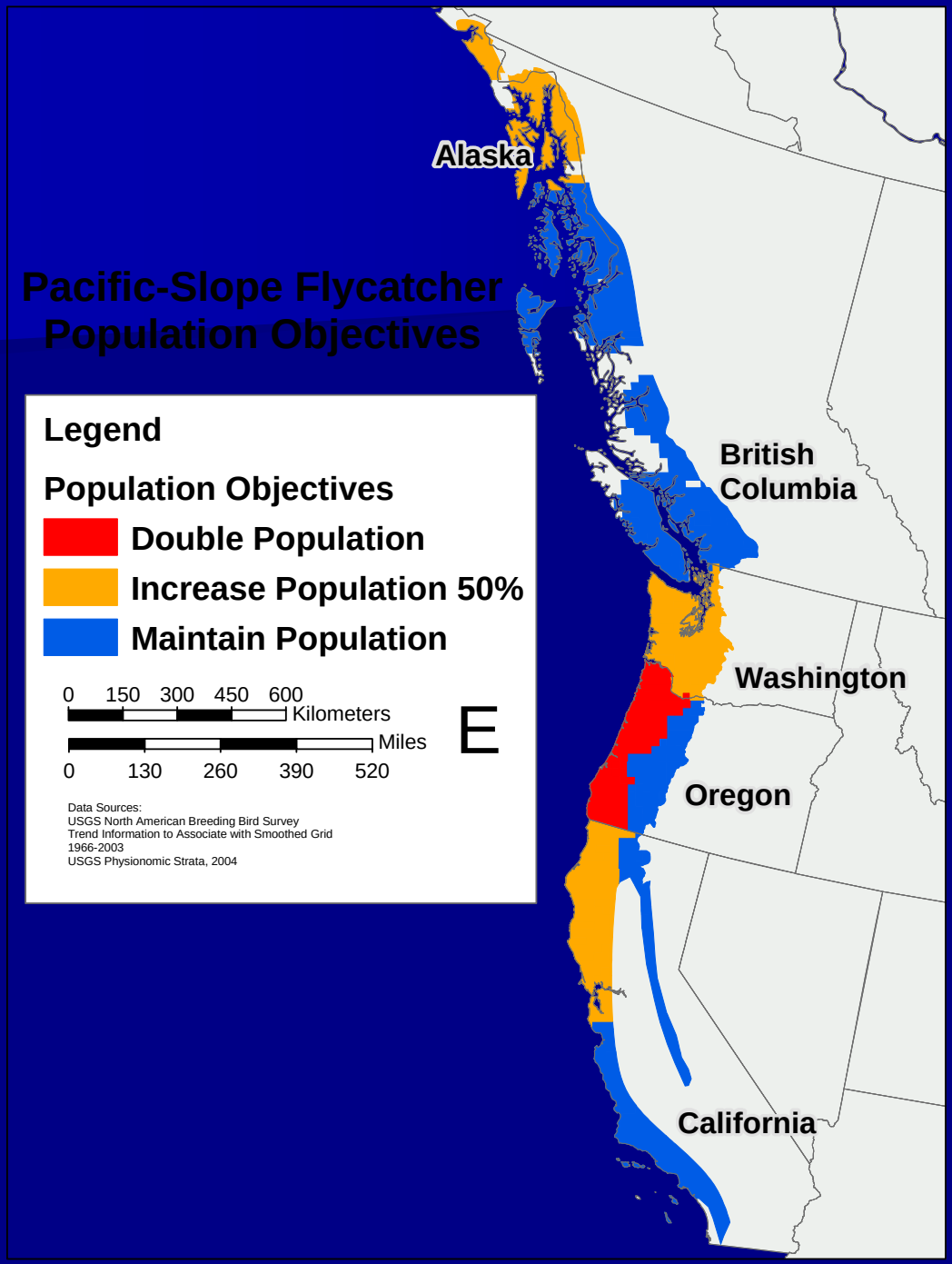
Pacific-slope Flycatcher Population Trends



	66-04	80-04
Cont	-0.6	-0.8
BCR 5	-0.9	-1.4
NPR	2.2	0.2
AK	0.6	1.5
BC	1.6	-0.1
SPR	-2.5	-2.3
CAS	-1.5	-1.8
WA	-2.5	-2.3
OR	-3.0	-3.1
BCR 32	-0.1	-0.1
CF	0.1	0.2
BCR 15	1.1	-0.7

Draft Preliminary Population Objectives

Pacific-Slope Flycatcher Population Objectives



Regional/Local "Preliminary" Population Objectives: Conifer Focal Species in W. WA

- **Double**
  - Orange-crowned Warbler
- **Increase 50%**
  - Pacific-slope Flycatcher
  - Varied Thrush
- **Maintain**
  - Winter Wren
  - Hermit Warbler
  - Swainson's Thrush

Pacific-slope Flycatcher: Current Population and Objective

Forest Type and Age Class	Hectares	Bird Density (Pairs/ha)	Population (# indiv)	Population Target	Birds Needed
WH 21-40	775				
WH 41-60	369	0.27 (8)	199		
WH 61-80	1,817	0.70 (9)	2,544		
WH 81-160	240	0.80 (10)	384		
WH 160+	3,746	1.09 (6)	8,166		
			11,293	16,939	5,646

Translating the Population Objective into Habitat

- **How can we get more birds?**
  - Natural Succession
  - Management Options
- **Habitat Management**
  - Thinning
    - 100% of young forest (41-60 years)
    - Losses in early years of thin negated by gains in later years
  - Harvest
    - 10% of mature forest (61-80 years)

Natural Succession (30 yrs) + Management

- Gain = **1,436** birds
- Still 4,210 birds short of the 5,646 needed to increase population by 50%
- Percent Population Gain = **25%**

Future Population (30 years) with Natural Succession and Management (Thin and Harvest)

	Hectares (old)	Hectares (new)	Bird Density (# pairs / ha)	Population (# indiv)	Birds Short
WH 21-40	775				
WH 41-60	369	798	0.27 (8)	432	
WH 61-80	1,817	573	0.70 (9)	802	
WH 81-160	240	2,002	0.80 (10)	3,203	
WH 160+	3,746	3,804	1.09 (6)	8,292	
	5,956	7,177		12,729	4,210

Current Population = 11,293
Gain = 1,436 birds

Pacific-slope Flycatcher: Habitat and Population Objective -1

- In the next 30 years, *increase suitable habitat by 1,221 ha* through natural succession of all forest except 100% thinning of WH 41-60 years, and 10% harvest of WH 61-80 years resulting in *a population increase of 1,436 birds or a 25% increase*

Pacific-slope Flycatcher: Comments on Outcomes

- Not all of watershed
- The objective is for larger-scales
- Just one species, not optimized for other species or other management

Oak Example: GIS Layer Habitat Conditions

Oak Dominant
- >25% canopy cover oak and <25% conifer

Oak-Conifer
- Both oak and conifer >25% canopy cover

Scattered Oak (Savannah)
- 5-25% canopy cover with >50% oak

Urban Oak
- >10% canopy cover of oak in urban setting

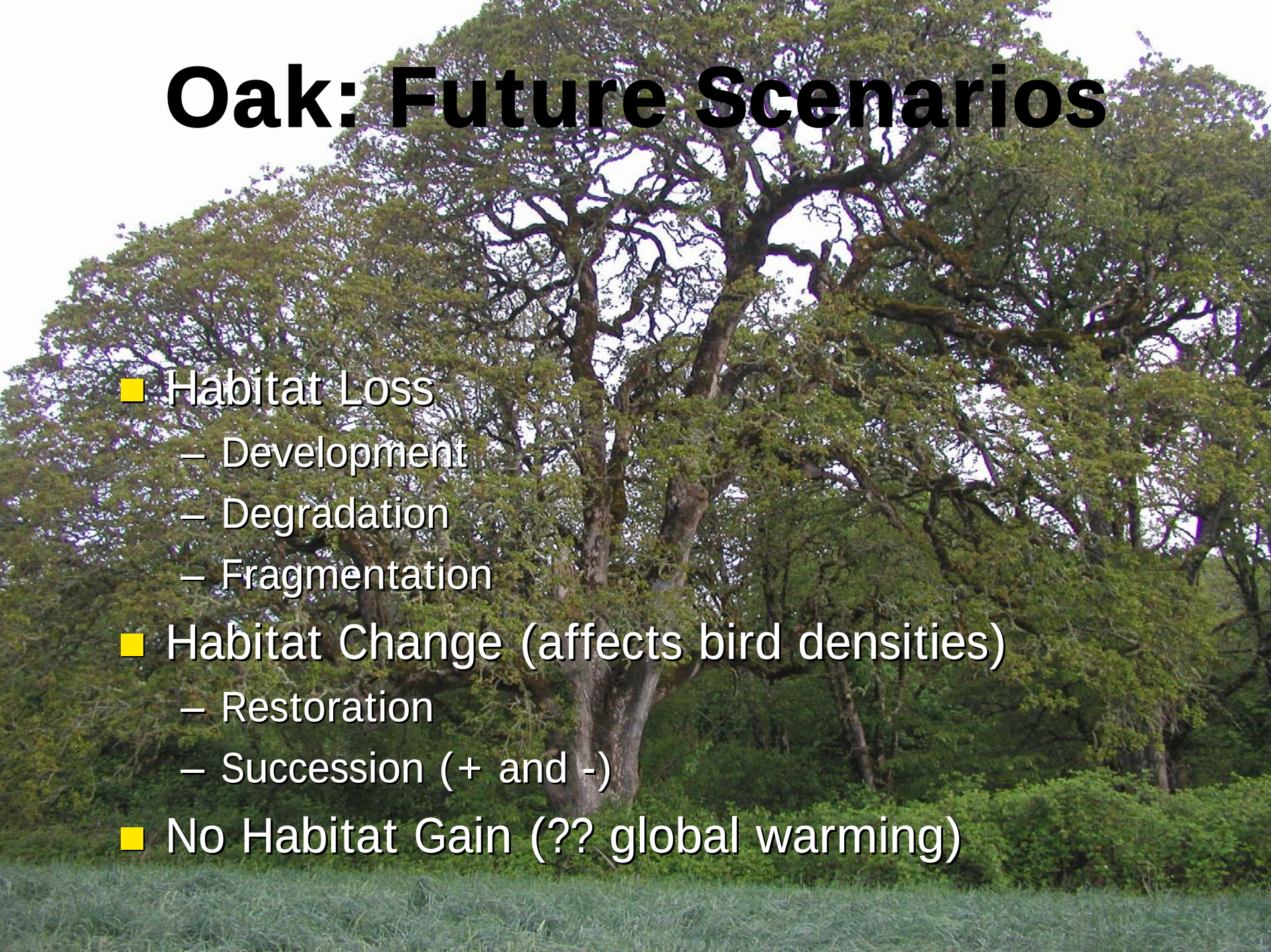
Oak Example: Three Sites

- Fort Lewis Military Installation
  - Large (2,435 ha oak)
  - Federal public land managed for oak
- Scatter Creek Wildlife Management Area
  - Small (67 ha oak)
  - State public land managed for oak
- Scatter Creek Corridor
  - Moderate size (631 ha oak)
  - Private with little to no management for oak

Predicting the Future for Oaks in the South Puget Sound

- Projecting change….
  - Data from “Futures” Analyses of Pierce County (habitat loss)
  - Consultation and professional judgment -of land managers, biologists, ecologists

Oak: Future Scenarios



- Habitat Loss
  - Development
  - Degradation
  - Fragmentation
- Habitat Change (affects bird densities)
  - Restoration
  - Succession (+ and -)
- No Habitat Gain (?? global warming)

Oak Habitat Futures: Consultation 1

Site	Habitat Loss (%)		
	Development	Degradation	Fragmentation
Fort Lewis	1	5	?
Scatter Creek WMA	0	15	?
Scatter Creek private	2	15	?

Development: pavement, houses, etc.
Degradation: conifer-dominated to gone
Fragmentation: from development and degradation losses

Oak Habitat Futures: Consultation 2

Site	Habitat Change (%)		
	Restoration	Succession (+)	Succession (-)
Fort Lewis	30	10	1
Scatter Creek WMA	50	10	2
Scatter Creek private	10	5	20

Restoration: change from oak-conifer to oak-dominated
Succession (+): change from younger oak to older oak
Succession (-): change from oak-dominated to oak-conifer

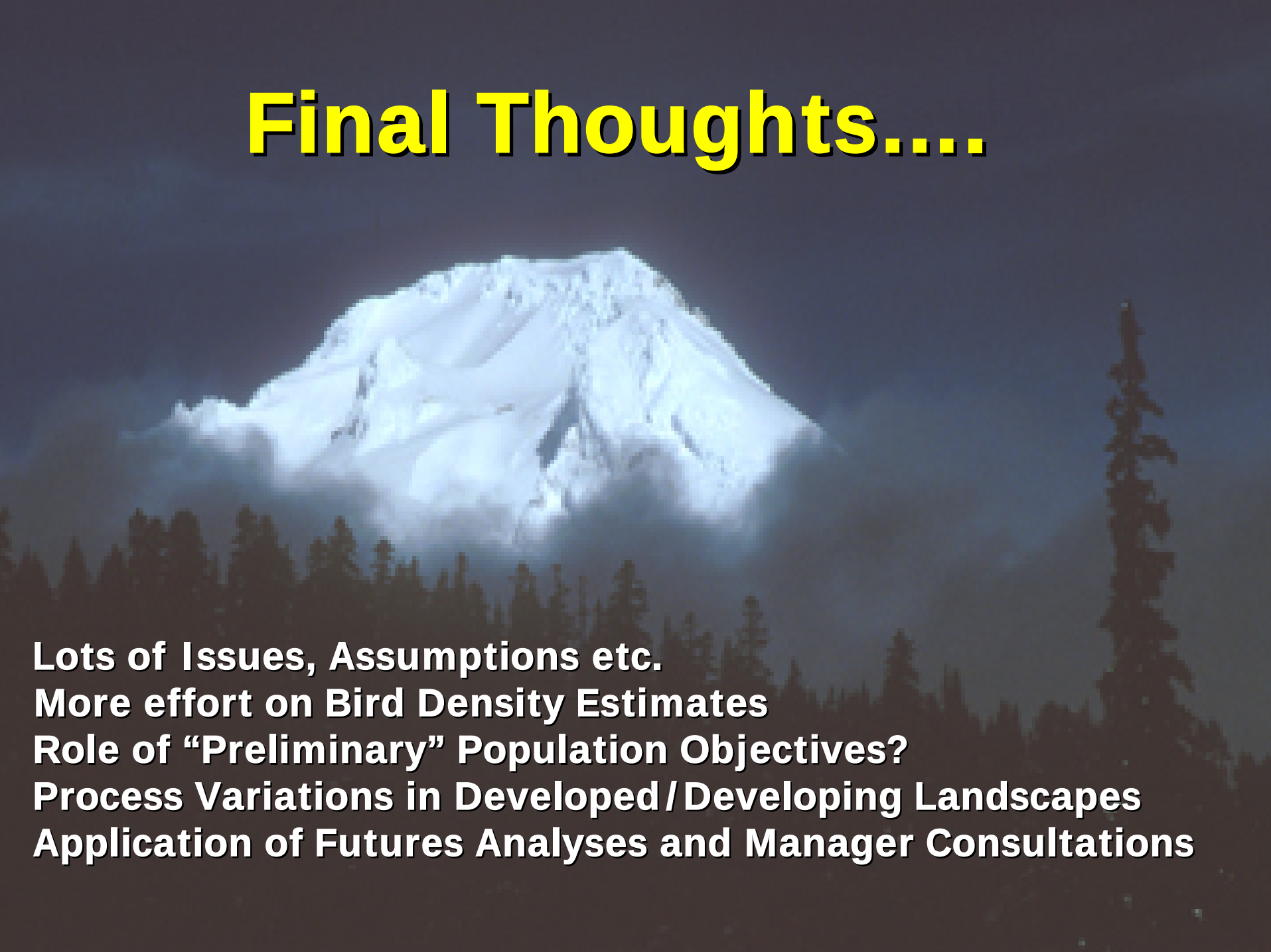
Oak Example: Habitat Objectives

Habitat losses likely to exceed gains ….so "ideal" bird population objective may be irrelevant… example habitat objective might be to simply *protect and restore X% of oak-conifer to oak dominant*, recognizing habitat losses and degradation that will occur…

Oak Focal Species: Current and Future (+ or -) Populations (# indivds)

Site	BCCH	DOWO	WEWP	PUFI	CHSP
Fort Lewis	273 286	117 122	1,496 1,571	315 329	1,564 1,643
Scatter Creek WMA	21 29	6 7	53 54	16 16	10 10
Scatter Creek private	158 151	44 42	373 357	153 146	96 90
	+14	+4	+60	+7	+73

Final Thoughts....



Lots of Issues, Assumptions etc.
More effort on Bird Density Estimates
Role of “Preliminary” Population Objectives?
Process Variations in Developed/Developing Landscapes
Application of Futures Analyses and Manager Consultations